

Honor Algebra II Final Exam REVIEW

Name: Key

Multiple Choice

Identify the choice that best completes the statement or answers the question.

Simplify.

C 1. $\frac{x^2 + x - 20}{x^2 - 25}$

a. $\frac{x+4}{x+5}, x \neq -5$

b. $\frac{x-4}{x-5}, x \neq 5$

c. $\frac{x-4}{x-5}, x \neq -5$

d. $\frac{x+4}{x+5}, x \neq 5$

Solve the equation. Check your solution(s).

A 2. $\sqrt{3x+43} = x-9$

a. $x = 19$

b. $x = -2$ and $x = -19$

c. $x = 2$

d. $x = 2$ and $x = 19$

D 3. $-2\sqrt{128x} + 20 = -12$

a. $x = -15$

b. $x = \frac{1}{64}$

c. $x = \frac{1}{8}$

d. $x = 2$

$$3x + 49 = x^2 - 18x + 81$$

$$0 = x^2 - 21x + 38$$

$$0 = (x-19)(x-2)$$

$$\sqrt{128x} = 16$$

$$128x = 256$$

Simplify the expression.

C 4. $\frac{24e^8}{8e^5}$

a. $16e^3$

b. $3e^{40}$

c. $3e^3$

d. $16e^{40}$

Find the sum or difference.

C 5. $\frac{x+3}{2x+10} - \frac{-2x+20}{x^2-5x-50}$

a. $\frac{x+2}{2(x+5)}, x \neq 10$

b. $\frac{x-10}{2(x+5)}, x \neq 10$

c. $\frac{x+7}{2(x+5)}, x \neq 10$

d. $\frac{x-1}{2(x+5)}, x \neq 10$

$$\frac{x+3}{2(x+5)} - \frac{(-2x+20)}{(x+5)(x-10)}$$

$$(x+3)(x-10) - (2(-2x+20))$$

$$x^2 - 7x - 30 - (-4x + 40)$$

$$x^2 - 7x - 30 + 4x - 40$$

$$x^2 - 3x - 70$$

$$(x-10)(x+7)$$

$$2(x+5)(x-10)$$

$$\frac{x+7}{2(x+5)}; x \neq 10$$

D

6. $\frac{20}{6x^2} - \frac{19}{6x^2}$

a. $\frac{13}{2x^2}$

b. $\frac{1}{x^2}$

c. $\frac{13}{4x^2}$

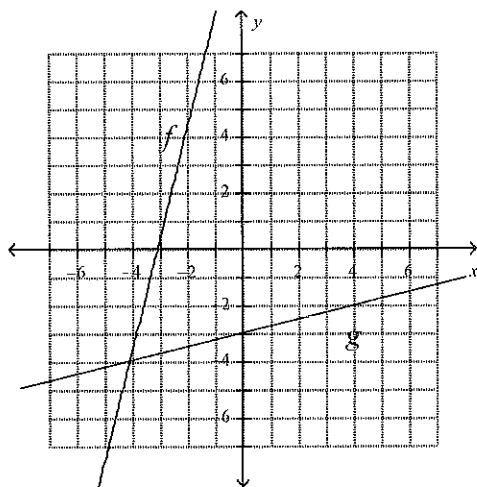
d. $\frac{1}{6x^2}$

Find the inverse of the function. Then graph the function and its inverse.

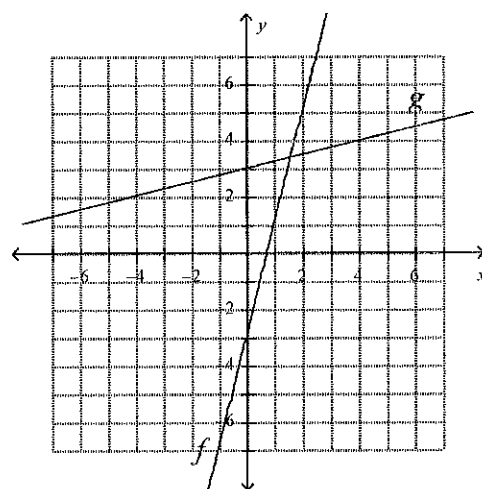
D

7. $f(x) = 4x - 3$

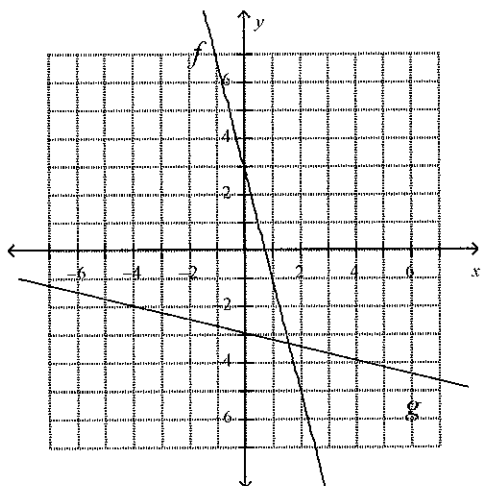
a. $g(x) = \frac{x+3}{4}$



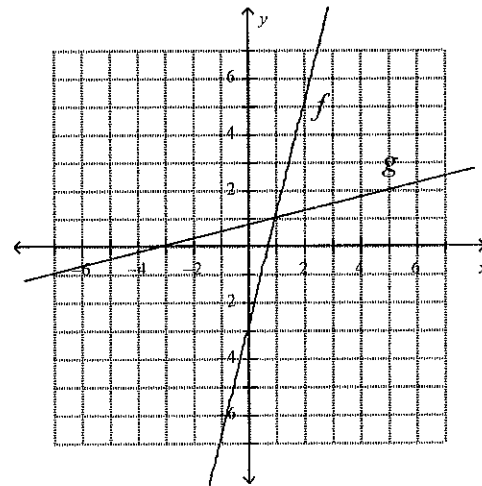
c. $g(x) = \frac{1}{4}x + 3$



b. $g(x) = \frac{1}{4}x + 3$



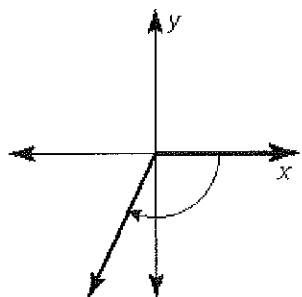
d. $g(x) = \frac{x+3}{4}$



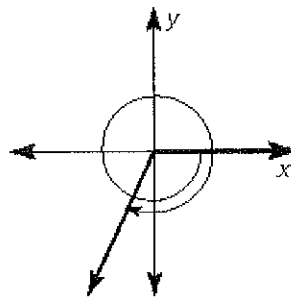
D

8. Draw an angle that measures 475° in standard position.

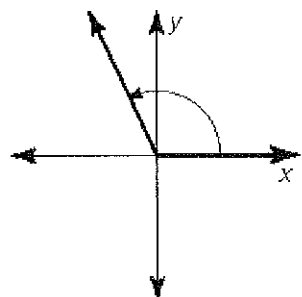
a.



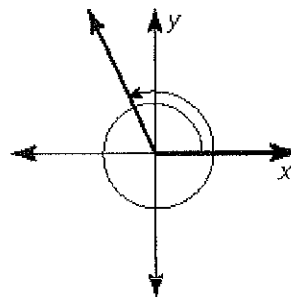
c.



b.



d.



Evaluate the expression using a calculator. Round your answer to two decimal places when appropriate.

B

9. $\sqrt[4]{2401}$
 a. 600.25
 b. 7

- c. 49
 d. 0.14

D

10. Which angle is coterminal with -224° ?
 a. -404°
 b. -134°

- c. -494°
 d. 136°

A

11. Let $(3, -4)$ be a point on the terminal side of an angle θ in standard position. Evaluate the six trigonometric functions of θ .

a. $\sin \theta = -\frac{4}{5}, \csc \theta = -\frac{5}{4}$

$\cos \theta = \frac{3}{5}, \sec \theta = \frac{5}{3}$

$\tan \theta = -\frac{4}{3}, \cot \theta = -\frac{3}{4}$

b. $\sin \theta = -\frac{2}{3}, \csc \theta = -\frac{3}{2}$

$\cos \theta = \frac{1}{2}, \sec \theta = 2$

$\tan \theta = -\frac{4}{3}, \cot \theta = -\frac{3}{4}$

c. $\sin \theta = \frac{4}{5}, \csc \theta = \frac{5}{4}$

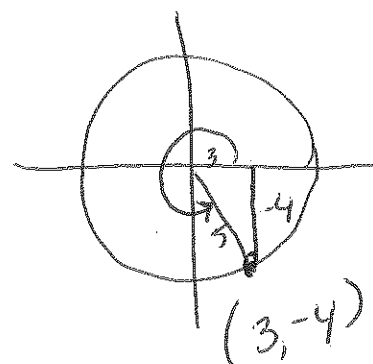
$\cos \theta = \frac{3}{5}, \sec \theta = \frac{5}{3}$

$\tan \theta = \frac{4}{3}, \cot \theta = \frac{3}{4}$

d. $\sin \theta = -\frac{4}{5}, \csc \theta = -\frac{5}{4}$

$\cos \theta = -\frac{3}{5}, \sec \theta = -\frac{5}{3}$

$\tan \theta = \frac{4}{3}, \cot \theta = \frac{3}{4}$



$-\frac{4}{3}$

Condense the logarithmic expression.

A 12. $3\log x - 2\log 7$

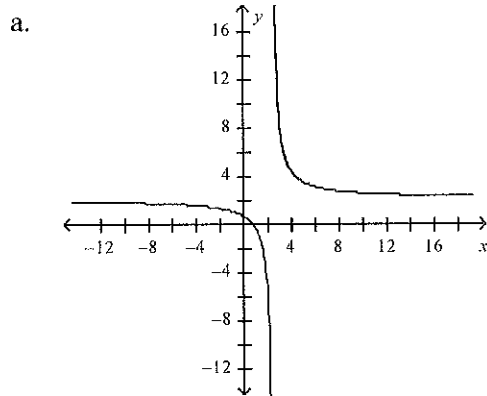
a. $\log \frac{x^3}{49}$

b. $\log(3x - 14)$

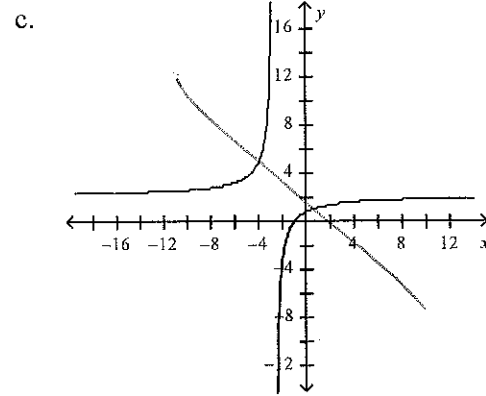
c. $\log \frac{3x}{14}$

d. $\log(x^3 - 49)$

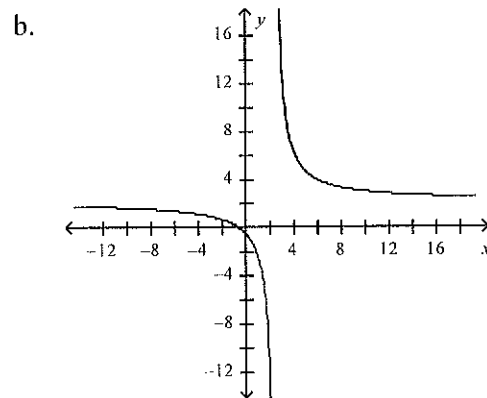
B 13. Graph $f(x) = \frac{8x+6}{4x-10}$. State the domain and range.



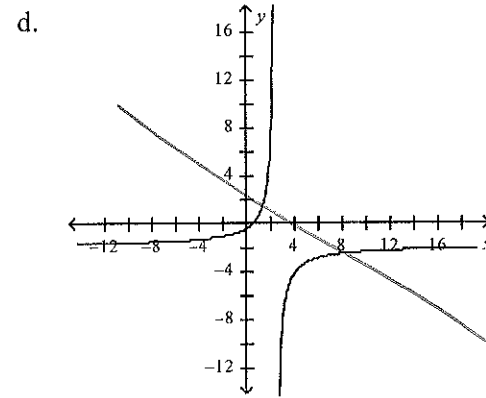
The domain is all real numbers except -2.5 , and the range is all real numbers except 2 .



The domain is all real numbers except -2.5 , and the range is all real numbers except 2 .



The domain is all real numbers except 2.5 , and the range is all real numbers except 2 .



The domain is all real numbers except 2.5 , and the range is all real numbers except 2 .

D 14. Find the reference angle θ' for $\theta = 335^\circ$.

a. 245°

b. 30°

c. 335°

d. 25°

Find the product.

B 15. $\frac{4x^2 - 24x}{x^2 + 3x - 54} \cdot \frac{x^2 + x - 72}{14x^2}$

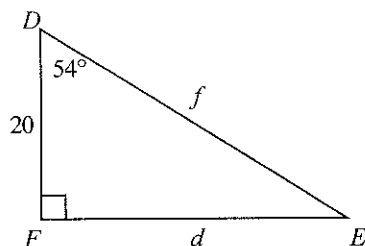
a. $\frac{7(x-9)}{x^2}, x \neq -8, x \neq 9$

b. $\frac{2(x-8)}{7x}, x \neq -9, x \neq 6$

c. $\frac{2(x+8)}{7x}, x \neq -9, x \neq 6$

d. $\frac{7(x+9)}{2x}, x \neq -8, x \neq 9$

C 16. Solve $\triangle DEF$.



$\tan 54 = \frac{d}{20}$

a. $E = 36^\circ, d \approx 18.62, f \approx 11.76$

b. $E = 36^\circ, d \approx 14.53, f \approx 11.76$

c. $E = 36^\circ, d \approx 27.53, f \approx 34.03$

d. $E = 126^\circ, d \approx 27.53, f \approx 24.72$

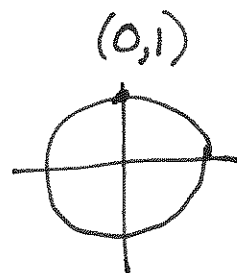
A 17. Use the unit circle to evaluate the six trigonometric functions of $\theta = -\frac{3\pi}{2}$.

a. $\sin \theta = 1, \csc \theta = 1$
 $\cos \theta = 0, \sec \theta = \text{undefined}$
 $\tan \theta = \text{undefined}, \cot \theta = 0$

b. $\sin \theta = 1, \csc \theta = 1$
 $\cos \theta = 0, \sec \theta = 0$
 $\tan \theta = 0, \cot \theta = 0$

c. $\sin \theta = 1, \csc \theta = 1$
 $\cos \theta = \text{undefined}, \sec \theta = 0$
 $\tan \theta = 0, \cot \theta = \text{undefined}$

d. $\sin \theta = 0, \csc \theta = 1$
 $\cos \theta = 1, \sec \theta = \text{undefined}$
 $\tan \theta = 0, \cot \theta = \text{undefined}$



Simplify the expression.

D 18. $6^5 \sqrt{1458} + 8^5 \sqrt{6}$

a. $\frac{8796}{5}$

b. $14^5 \sqrt{1464}$

c. $26^{10} \sqrt{6}$

d. $26^5 \sqrt{6}$

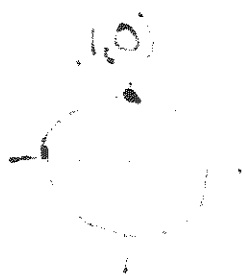
D 19. Use $\log_2 5 \approx 2.322$ and $\log_2 7 \approx 2.807$ to evaluate $\log_2 125$.

a. 5.129

b. 2.322

c. 6.518

d. 6.966



Use the properties of radicals to simplify the expression.

A 20. $\frac{\sqrt[3]{10}}{\sqrt[3]{5} \cdot \sqrt[3]{54}}$

a. $\frac{1}{3}$

b. $\frac{1}{81}$

c. 27

d. $\frac{1}{27}$

A 21. In a right triangle, θ is an acute angle and $\csc \theta = \frac{12}{11}$. Evaluate the other five trigonometric functions of θ .

a. $\sin \theta = \frac{11}{12}$

$\cos \theta = \frac{\sqrt{23}}{12}$ $\sec \theta = \frac{12\sqrt{23}}{23}$

$\tan \theta = \frac{11\sqrt{23}}{23}$ $\cot \theta = \frac{\sqrt{23}}{11}$

b. $\sec \theta = \frac{11}{12}$

$\cos \theta = \frac{\sqrt{23}}{12}$ $\sin \theta = \frac{12\sqrt{23}}{23}$

$\tan \theta = \frac{11\sqrt{23}}{23}$ $\cot \theta = \frac{\sqrt{23}}{11}$

c. $\sin \theta = \frac{11}{12}$

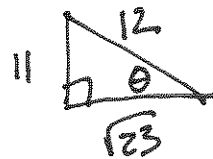
$\cos \theta = \frac{12\sqrt{23}}{23}$ $\sec \theta = \frac{\sqrt{23}}{12}$

$\tan \theta = \frac{\sqrt{23}}{11}$ $\cot \theta = \frac{11\sqrt{23}}{23}$

d. $\sec \theta = \frac{12}{11}$

$\cos \theta = \frac{12\sqrt{23}}{23}$ $\sin \theta = \frac{\sqrt{23}}{12}$

$\tan \theta = \frac{\sqrt{23}}{11}$ $\cot \theta = \frac{11\sqrt{23}}{23}$



B 22. Convert $\frac{31\pi}{18}$ to degrees.

a. 490°

b. 310°

c. 400°

d. 220°

$\frac{31\pi}{18} \cdot \frac{180}{\pi} =$

A 23. Which angle is coterminal with 241° ?

a. -479°

b. -209°

c. -29°

d. 61°

B 24. Determine whether the inverse of $f(x) = \frac{5}{4x}$ is a function. Then find the inverse.

a. yes;

$g(x) = \frac{4}{5x}$

c. no;

$g(x) = \frac{4x}{5}$

b. yes;

$g(x) = \frac{5}{4x}$

d. no;

$g(x) = 5 - 4x$

3

3

11
10
11
12

128
11
11

3

3

3

Expand the logarithmic expression.

D 25. $\log_7 \frac{2x}{y^5}$

a. $2\log_7 x - 5\log_7 y$

b. $\log_7 2 - \log_7 x + 5\log_7 y$

c. $\log_7 2 + \log_7 x + 5\log_7 y$

d. $\log_7 2 + \log_7 x - 5\log_7 y$

Solve the equation.

C 26. $\frac{2}{x-5} - 2 = \frac{20}{x^2 - 25}$

a. $x = 4, x = 8$

b. $x = 4$

c. $x = -4$

d. $x = -4, x = -8$

A 27. $\frac{20}{x-3} = \frac{16x^2}{x^2-9} - \frac{8x}{x+3}$

a. $x = \frac{5}{2}$

b. $x = \frac{5}{2}, x = -3$

c. $x = \frac{5}{2}, x = 5$

d. $x = 5$

Solve the equation.

A 28. $3^x = 16$

a. $x \approx 2.524$

b. $x \approx 5.333$

c. $x \approx 1.204$

d. $x \approx 0.188$

A 29. $\log_2(3x+6) = \log_2(x-2)$

a. $x = -4$

b. $x = 1$

c. $x = 2$

d. $x = -2$

C 30. $\log_5(x+5) = 2$

a. $x = 5$

b. $x = 27$

c. $x = 20$

d. $x = 30$

Evaluate the logarithm.

D 31. $\log_4 8$

a. $\frac{2}{3}$

b. 2

c. $\frac{1}{2}$

d. $\frac{3}{2}$

$$x^2 - 25$$

$$2(x+5) - 2(x+5)(x-5) = 20$$

$$2x + 10 - (2x^2 - 50) = 20$$

$$2x + 10 - 2x^2 + 50 = 20$$

$$0 = 2x^2 - 2x - 40$$

$$0 = 2(x^2 - x - 20)$$

$$0 = 2(x-5)(x+4)$$

$$\log_3 16 = x$$

$$20(x+3) = 16x^2 - 8x(x-3)$$

$$20x + 60 = 16x^2 - 8x^2 + 24x$$

$$0 = 8x^2 - 20x - 36$$

$$0 = 4(2x^2 - 5x - 9)$$

$$0 = 4(2x - 9)(2x + 1)$$

-18

$$3x + 6 = x - 2$$

$$2x = -8$$

$$x = -4$$

$$25 = x + 5$$

$$x_1^2$$

$$0.5^2(1+x)(1-x) = (1+x)^2$$

$$0.5^2(1-x)(1+x) = (1-x)^2$$

$$0.5^2(1+x)^2 = 0.14 \times 2$$

$$1+x = 1.5 \times 1.5 = 2.25$$

$$0.5^2(1+x)^2 = 0.14 \times 2$$

$$1+x = 1.5 \times 1.5 = 2.25$$

$$S = (1+x)^2 = 2.25^2 = 5.0625$$

$$S = (1+x)^2 = 2.25^2 = 5.0625$$

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Write the expression in simplest form.

A 32. $\frac{1(3-\sqrt{5})}{(3+\sqrt{5})(3-\sqrt{5})}$ $\frac{3-\sqrt{5}}{9-5}$

a. $\frac{3-\sqrt{5}}{4}$

b. $\frac{3+\sqrt{5}}{14}$

c. $\frac{3-\sqrt{5}}{14}$

d. $\frac{3+\sqrt{5}}{4}$

Find the real solution(s) of the equation. Round your answer to two decimal places when appropriate.

D 33. $(x+2)^5 = 243$ $x+2=$

a. $x = \pm 3$

b. $x = -5$

c. $x = 3$

d. $x = 1$

Find the quotient.

D 34. $\frac{-10x}{9x+45} \div \frac{x^2-2x}{x^2+3x-10}$

a. $\frac{9}{-10}, x \neq -5, x \neq 0, x \neq 2$

b. $\frac{9}{10}, x \neq -5, x \neq 2$

$\frac{-10x}{9(x+5)} \cdot \frac{(x+5)(x-2)}{x(x-2)}$

c. $-\frac{10}{9}, x \neq -5, x \neq 0, x \neq 2$

d. $-\frac{10}{9}, x \neq -5, x \neq 2$

Solve the inequality.

A 35. $-8\sqrt[3]{x-4} - 4 > 20$

a. $x < -23$

b. $x > -1724$

c. $x < -1724$

d. $x > -23$

$\sqrt[3]{x-4} > -3$
 $x-4 < -27$
 $x < -23$

B 36. The variables x and y vary inversely, and $y = 3$ when $x = 8$. Write an equation that relates x and y . Then find y when $x = -9$.

a. $y = 24x; y = -216$

b. $y = \frac{24}{x}; y = -\frac{8}{3}$

c. $y = 11 - x; y = 20$

d. $y = \frac{x}{24}; y = -\frac{3}{8}$

$y = \frac{a}{x}$ $y = \frac{24}{x}$

$3 = \frac{a}{8}$

$a = 24$

2-8
2-9

3-2
3-3

3-4

2-15-42

3-5

$(1-x)(1+x)$ XOR
 $(1-x)^2$ $(1+x)^2$

2-15-42 2-15-42
2-15-42 2-15-42
2-15-42

3-6

3-7

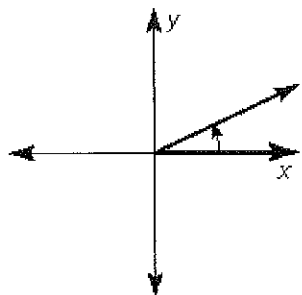
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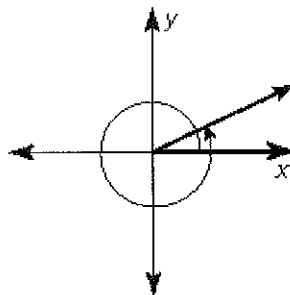
A

37. Draw an angle that measures 25° in standard position.

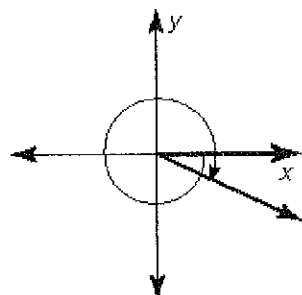
a.



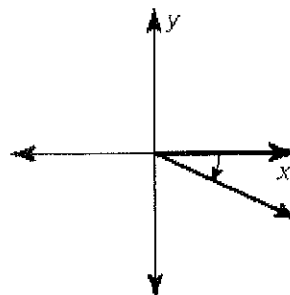
c.



b.



d.



A

38. Convert 70° to radians.

a. $\frac{7\pi}{18}$ rad

b. $\frac{18\pi}{7}$ rad

c. $\frac{7\pi}{36}$ rad

d. $\frac{36\pi}{7}$ rad

$70 \cdot \frac{\pi}{180}$

B

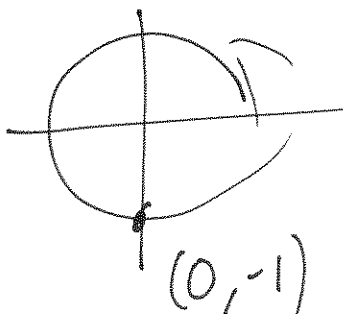
39. Use the unit circle to evaluate the six trigonometric functions of $\theta = -90^\circ$.

a. $\sin \theta = 0$, $\csc \theta = 1$
 $\cos \theta = -1$, $\sec \theta = \text{undefined}$
 $\tan \theta = 0$, $\cot \theta = \text{undefined}$

b. $\sin \theta = -1$, $\csc \theta = -1$
 $\cos \theta = 0$, $\sec \theta = \text{undefined}$
 $\tan \theta = \text{undefined}$, $\cot \theta = 0$

c. $\sin \theta = -1$, $\csc \theta = -1$
 $\cos \theta = \text{undefined}$, $\sec \theta = 0$
 $\tan \theta = 0$, $\cot \theta = \text{undefined}$

d. $\sin \theta = -1$, $\csc \theta = -1$
 $\cos \theta = 0$, $\sec \theta = 0$
 $\tan \theta = 0$, $\cot \theta = 0$



10

100

100

100

100

100

- B 40. The discharge of water Q (in cubic feet per second) as it flows through an open ditch can be measured with Manning's formula:

$$Q = \frac{1.486}{n} R^{2/3} S^{1/2}$$

In the formula, n is the roughness factor, R is the mean hydraulic radius (in feet), and S is the slope. What is the approximate discharge of water from a ditch with a roughness factor of 0.018, a radius of 1.4 feet, and a slope of 0.2?

a. about $145.72 \frac{\text{ft}^3}{\text{s}}$

b. about $46.2 \frac{\text{ft}^3}{\text{s}}$

c. about $53.35 \frac{\text{ft}^3}{\text{s}}$

d. about $5.33 \frac{\text{ft}^3}{\text{s}}$

$$Q = \frac{1.486}{0.018} (1.4)^{2/3} (.2)^{1/2}$$

Rewrite the equation in logarithmic form.

D 41. $3^{-1} = \frac{1}{3}$

a. $\log \frac{1}{3} = 3$

b. $\log_1 3 = \frac{1}{3}$

c. $\log_3(-1) = \frac{1}{3}$

d. $\log_3 \frac{1}{3} = -1$

5. 1000 - 1000 = 0